

March 07, 2001

To Sumitomo Rubber Industries Limited
Intellectual Property Division
Atsuro SUMITOMO

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Please refer to next page.

Sankyo Patent Attorneys Office

To Eriko KAMITANI

Dear Sir, I'm glad to hear that things are going well for you.

Now, for preparing a specification (corrected version) of your case No.K1010014 (Our case No.28307), I would like to ask the following point in addition to what we talked on the phone yesterday.

The working examples added are summarized as shown in the attached Table 3. This surely indicates that NCO content of urethane prepolymer affects the initial repulsion and shot feeling.

Herein, it is considered that NCO content of

urethane prepolymer affects the amount (ratio) of the urethane bond of the resultant polyurethane. On the other hand, it is assumed that the amount of the urethane bond of the resultant polyurethane depends on the case of using the curing agent having either a large molecular weight or a small molecular weight as well as NCO content of the urethane prepolymer.

If not, doesn't the content of OH group to the molecular weight of the curing agent affect the crosslinking density (the amount of urethane bond) significantly?

If affecting, it is necessary that the examples where OH content of the curing agent are varied are added. It is assumed that it will be difficult to add the examples like this at the present stage. Therefore, regarding the restriction of NCO content, is it possible to add the limiting elements such as "in the case that diol having a molecular weight of to is used as the curing agent and mixed in the equivalent ratio of OH:NCO to " or "in the case that diol having a OH content of to % by mass is used as the curing agent and mixed in the equivalent ration of OH:NCO to ""

Table 3

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	Ball No.	2	11	12	13	14
Polyol	Type	PCG	PCG	PCG	PCG	PCG
	Molecular weight	1987	1987	1987	1987	1987
Prepolymer	NCO content	8.4	4.8	6.1	11.8	16.3
	Molecular weight	2896	3298	2935	2738	2605
Curing agent	1,4-butanediol					
Golf ball	Hardness	53	38	46	58	71
	Initial repulsion index	98	94	97	102	105
Characteristics	Heat resistance	95	90	93	96	98
	Weather resistance	92	88	90	94	92
	Water resistance	90	85	89	92	93
	Shot feeling	○	△	○	○	×
<i>Mole ratio of MDI to PCG</i>						
	4.0:1	2.8:1	3.3:1	5.4:1	7.0:1	

As Attorney Kamitani pointed out, there is some influence of the molecular weight of the curing agent (provided that the influence is not so large as the polyol, because the ratio of the curing agent to whole polyurethane is small). Thus, please restrict as follows: "A diol or a diamine having a molecular weight of 50 to 500 is used as the curing agent and mixed in the equivalent ratio(OH/NCO or NH₂/NCO) ranging from 0.8 to 1.2."